

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of
Frederic BELLOTT et al.
Corres. to PCT/EP2003/012764
For: CONDENSER

VERIFICATION OF TRANSLATION

Commissioner for Patents
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Sir:

I, Elisabeth Ann LUCAS,

Director of RWS Group Ltd, of Europa House, Marsham Way, Gerrards Cross, Buckinghamshire, England declare:

That the translator responsible for the English translation of the attached is familiar with both the German and the English language, and that, to the best of RWS Group Ltd knowledge and belief, the English translation of International Application No. PCT/EP2003/012764 is a true, faithful and exact translation of the corresponding German language paper.

I further declare that all the statements made in this declaration of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of legal decisions of any nature based on them.

Signature :



Date: May 3, 2005

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Condenser

The invention relates to a condenser, in particular a brazed refrigerant condenser, in particular for motor-5 vehicle air-conditioning units, consisting of a block of tubes and ribs and collecting tubes which are arranged on both sides and which, at least on one side of the block, have a base, accommodating the ends of the tubes, and a cover, and of a collector which is arranged parallel to a collecting tube, is fluidically connected to the collecting tube via connecting openings and is composed of a tube and a short profile piece having the connecting openings.

15 In the earlier Patent Application having the reference 101 54 891.5, the collecting tube of the condenser is of two-piece design and consists of a base with passages for accommodating tube ends and of a cover with two passages which form connecting openings to an 20 adjacent collector. The collector, on the one side, is composed of a welded or brazed, relatively thin-walled tube and an extruded profile piece, the profile piece having holes for receiving the passages of the cover. A dividing wall is put into the collecting tube between 25 the two connecting openings. The production of such a condenser is not without technical problems, in particular with regard to the connecting openings between collecting tube and collector.

30 DE-A 198 48 744 has disclosed a further refrigerant condenser, although having a one-piece collecting tube. The collector there is composed of a thin-walled tube and an extruded profile piece, the profile piece, in the region of the connecting openings, having a bearing 35 surface which is adapted to the profile of the collecting tube and serves as contact surface for the brazing. A disadvantage with this type of construction is that collecting tube and collector must first be

fixed relative to one another by tack welding before the brazing.

5 The object of the present invention is to improve a refrigerant condenser of the type mentioned at the beginning to the effect that the connecting openings between collector and collecting tube are simple to produce and can be brazed in a reliable manner.

10 This object is achieved by the features of patent claim 1.

15 Integrally formed on the profile piece of the collector is a cover profile which corresponds to a first cover part of the collecting tube. As a result, the profile piece is connected via the cover profile directly to a base part, such as the base of the collecting tube. This results in the advantage that passages or similar openings no longer have to be provided in the first 20 cover part, since the profile piece already has the connecting openings. A manufacturing step is thus dispensed with and the risk of leaky brazing occurring between cover part and profile piece in the region of the connecting openings is thus likewise removed.

25 Advantageous configurations of the invention follow from the subclaims.

30 According to an advantageous development of the invention, the first cover part integrally formed on the profile piece is supplemented by a shortened second cover part. This shortened second cover part directly adjoins the first cover part and is connected to the base part or base.

35 In a further configuration of the invention, grooves in which the longitudinal edges of the base part or base engage are arranged parallel to the longitudinal edges

of the first cover part. This makes it possible to fix the profile piece or first cover part and the base part or base on the one hand and permits reliable brazing on the other hand.

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According to a further advantageous development of the invention, the first cover part, with its top edge, is stepped relative to the top edge of the profile piece and at the same time forms a bearing surface for the 10 shortened second cover part. This results in sound brazing in this joint region between first cover part and second cover part on account of the overlapping with the profile piece.

15 Exemplary embodiments of the invention are shown in the drawing and are described in more detail below. In the drawing:

20 fig. 1 shows a perspective illustration of a profile piece with integrally formed cover part,

fig. 2 shows a modified embodiment of a profile piece with laterally arranged first cover part, and

25 fig. 3 shows the profile piece according to fig. 2 with mounted base part or base.

Fig. 1 shows part of a collector for a condenser, such as a refrigerant condenser. The collector 1 is composed 30 of a relatively thin-walled welded or brazed tube 2 (only partly shown) and of an extruded profile piece 3. Integrally formed on the profile piece 3 - advantageously likewise by extrusion - is a first 35 "cover part" 4, which has approximately the shape of a semicircle in cross section. The cover profile 4 extends in the longitudinal direction from a bottom edge 4a up to a top edge 4b. The profile piece 3, which is designed as a hollow cylinder, extends from a bottom

edge 3a up to a top edge 3b. Whereas the bottom edge 3a of the profile piece 3 and the bottom edge 4a of the first cover part 4 terminate flush with one another, the top edges 3b and 4b are offset from one another - 5 they form a step 5. A second cover part 6 is attached in the region of this step 5 and is arranged in alignment with the first cover part 4. With regard to its cross section, the second cover part 6 therefore has essentially the same geometry as the first cover 10 part 4. Dividing walls 7, 8 and an end wall 9 are inserted into the first cover part 4 and the second cover part. In the first cover part 4, a connecting opening 10 is arranged above the dividing wall 7 and a connecting opening 11 is arranged below the dividing 15 wall 7 - they may be incorporated, for example, as holes in the extruded profile piece 3. The first cover part 4 has two longitudinal edges 4c, 4d, which continue in longitudinal edges 6a, 6b of the second cover 6. Formed parallel to the longitudinal edge 4a on 20 the profile piece 3 is a lip 12, which together with the longitudinal edge 4d forms a groove 13. The first cover part 4 and the second cover part 6 form the entire cover of the collecting tube (not completely shown here). A base part or a base is put onto this 25 cover 4, 6, a factor which is not shown here, this base part or base, by means of one of its two longitudinal edges, engaging in the groove 13 and thus being fixed. The collector 1 and collecting tube are thus essentially preassembled as a subassembly.

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The first cover part is preferably part of the profile piece and can also be designated as cover profile.

35 The connection between the first and the second cover part and the base is effected by brazing.

In the exemplary embodiment in figure 1, the first cover part is oriented in such a way that the base to

be connected to it is oriented in such a way that the center plane of the tubes of the tube block intersects the tube profile as viewed in cross section. In this 5 case, it may be expedient if the section lies in the region of greatest extent of the tube or, in another exemplary embodiment, outside the region of greatest extent of the tube. In a further exemplary embodiment according to the invention, the center plane of the tube block does not intersect the tube profile.

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Fig. 2 shows a modified exemplary embodiment having a profile piece 14 which is designed as a hollow cylinder 15. A first cover part 16 is integrally formed parallel to and at the side of the hollow cylinder 15, this 15 cover part 16 being produced in one piece with the hollow cylinder 15 by extrusion. The first cover part 16 corresponds essentially to the profile 4 according to fig. 1, the connecting openings not being shown here. Arranged parallel to this first cover part 16 are two longitudinal grooves 17, 18, in which a base part 20 or base (not shown here) engages. The first cover part 16 continues in a second cover part 19 of the same cross section.

25 Fig. 3 shows the profile piece 14 according to fig. 2, the same reference numerals being used for the same parts. The perspective illustration shows a view into the interior of a hollow cylinder 15, into which three connecting openings 20, 21, 22 open, which come out of 30 the profile 16 on the other side - a factor which is not shown. Inserted into the grooves 17, 18 of the first cover part 16 is a base 23, which has a multiplicity of passages 24 for accommodating flat tubes (not shown). Due to this arrangement of the first 35 cover part 16 next to the hollow cylinder 15, the collector is located next to the tube/rib block (not shown), which may be advantageous in the motor vehicle for installation reasons.